

## CLAIMS

What is claimed is:

- 1           1.     A system for spraying an at least substantially fluid material comprising:  
2                 a source providing a controllable flow of the material to be sprayed;  
3                 a dosing unit that receives the flow of material from the source, that holds a  
4                 quantity of the material in a reservoir, and that outputs the material to a dispensing  
5                 device; and  
6                 a control arrangement that has as an input signal an indication of a fill level of the  
7                 reservoir and that outputs a flow control signal to the source such that the fill level in the  
8                 reservoir is maintained less than a maximum level and greater than a minimum level  
9                 when the dispensing device is active, the dosing unit thereby forming an active  
10                accumulator able to both receive material from the source and deliver material to the  
11                dispensing device at the same time.
  
- 1           2.     A system as in claim 1, further comprising:  
2                 a dosing pressure sensor that generates a dosing pressure signal corresponding  
3                 to a dosing pressure of material from the dosing unit to the dispensing device;  
4                 a pressure adjustment arrangement in the dosing unit that adjusts a pressure  
5                 applied to the reservoir in response to a dosing control signal;  
6                 in which the control arrangement has, as additional input signals, the dosing  
7                 pressure signal and a reference flow value, and generates the dosing control signal  
8                 such that the pressure adjustment arrangement adjusts the dosing pressure to cause a  
9                 material flow from the dispensing device to be at least substantially equal to the  
10                reference flow value when the dispensing device is activated.

1           3.     A system as in claim 2, in which:  
2           the source includes a first pump;  
3           the dosing unit comprises a second pump;  
4           the first pump produces a pump output flow of the material in response to the  
5 flow control signal; and  
6           the second pump receives the material output under pressure from the first pump  
7 and holds a dosage volume of the material in the reservoir; and  
8           the control arrangement generates the flow control signal also as a function of  
9 the pump output flow.

1           4.     A system as in claim 3, in which the first pump is a constant displacement  
2 flow pump.

1           5.     A system as in claim 4, in which the first pump is a pneumatically  
2 controlled piston pump.

1           6.     A system as in claim 5, in which the first pump is a 4-ball pump.

1           7.     A system as in claim 2, in which the control arrangement:  
2           generates the flow control signal also as a function of the pump output flow and  
3 the reference flow value; and  
4           generates the flow control signal and the dosing control signal such that the  
5 reservoir of the second pump is gradually filled with material when the dispensing  
6 device is not dispensing material.

1           8.     A system as in claim 1, in which:  
2           the fluid material includes inhomogeneities;  
3           all material passages in a flow path through the source and the dosing unit are  
4 larger than a maximum dimension of the inhomogeneities, which thereby pass  
5 undestroyed through the flow path.

1            9.     A system as in claim 8, in which the material is a PVC material and the  
2 inhomogeneities have lower density than the PVC.

1            10.    A system as in claim 9, in which the inhomogeneities are made of glass.

1            11.    A system as in claim 2, in which the reservoir of the dosing unit is a piston-  
2 cylinder.

1            12.    A system as in claim 2, further comprising a first elastic hose connecting  
2 the first pump to the second pump and having a first accumulation volume, in which the  
3 reservoir of the dosing unit has a maximum operating volume that exceeds the first  
4 accumulation volume over an operating pressure region.

1           13.    A system for spraying an at least substantially fluid material comprising:  
2           a source including a first pump providing a controllable source output flow of the  
3 material to be sprayed;  
4           a flow sensor that generates a flow signal indicating the source output flow;  
5           a dosing unit comprising a second pump that receives the output flow of material  
6 from the source, that holds a dosage volume of the material in a reservoir, and that  
7 delivers the material to a dispensing device;  
8           a volume sensor that generates a volume signal indicating a fill level of the  
9 reservoir;  
10          a dosing pressure sensor that generates a dosing pressure signal corresponding  
11 to a dosing pressure of material from the dosing unit to the dispensing device;  
12          a pressure adjustment arrangement in the dosing unit that adjusts a pressure  
13 applied to the reservoir in response to a dosing control signal;  
14          a control arrangement that outputs:  
15              a flow control signal to the source as a function of the volume signal, the  
16 flow signal, and a reference flow value, such that the fill level in the reservoir is  
17 maintained less than a maximum level and greater than a minimum level when the  
18 dispensing device is active, the dosing unit thereby forming an active accumulator able  
19 to both receive material from the source and deliver material to the dispensing device at  
20 the same time; and  
21              the dosing control signal as a function of the dosing pressure signal and  
22 the reference flow value such that the pressure adjustment arrangement adjusts the  
23 dosing pressure to cause a material flow from the dispensing device at least  
24 substantially equal to the reference flow value when the dispensing device is activated.

1           14.    In a system for spraying a material that includes a source providing a flow  
2 of the material to be sprayed, in which a flow path is defined from an output of the  
3 source to an input of a dispensing device, a method for estimating viscosity of the  
4 material comprising:

5            measuring the pressure of the material at a pair of points in the flow path; and  
6            computing an estimate of the viscosity of the material as a function of a pressure  
7 differential between the pair of points.

1           15.    In a system for spraying a material that includes a source providing a flow  
2 of the material to be sprayed, in which a flow path is defined from an output of the  
3 source to an input of a dispensing device, a method for estimating a time at which the  
4 dispensing device is activated comprising:

5            measuring the pressure of the material at a pair of points in the flow path; and  
6            estimating an initial activation time of the dispensing device as a function of a  
7 pressure differential between the pair of points.